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ABSTRACT

This report describes the basic objectives, assumptions, orientation and development of the Space Analysis Manuals Project. The main objective is to write and distribute a series of annuals describing methods and procedures for use by college and university personnel in planning and managing college and university facilities. One of the basic assumptions is that the primary audience will be composed of administrative personnel and faculty at new and/or small institutions who are not specialists in facilities planning and management. The material presented in the manuals will include, first, measures of present capacity, and, second, program planning and analysis, including detailed and generalized planning and analysis. The manuals will be oriented to the evaluation and management of existing facilities within the framework of present and future program requirements of an institution. A structural diagram of the project is also presented. The appendices give: (1) projections of program characteristics, including academic programs, academic support programs, administration, student services, and physical plant; (2) space management analysis and the projections of facilities requirements for instruction, research laboratories, offices, study, housing and dining, general use, physical education and athletics, and general support; (3) factor relationships in building space programming; and (4) the project schedule. (AF)

BR-8-0708
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PROJECT DESCRIPTION

WICHE Management Information Systems Program

HIGHER EDUCATION FACILITIES PLANNING AND MANAGEMENT MANUALS PROJECT

SAM-Space Analysis Manuals Project

In Cooperation With The American Association of Collegiate Registrars and Admissions Officers

November, 1969

PROJECT DESCRIPTION - SAM

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HE 001 355

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The Western Interstate Commission for Higher Education (WICHE) is a public agency through which the 13 western states work together

. . . to increase educational opportunities for westerners.
. . . to expand the supply of specialized manpower in the West.
. . . to help universities and colleges improve both their programs and their management.
. . . to inform the public about the needs of higher education.

The WICHE Management Information Systems Program was proposed by state coordinating agencies and colleges and universities in the West to be under the aegis of the Western Interstate Commission for Higher Education. The MIS Program proposes in summary:

To design, develop, and encourage the implementation of management information systems and data bases including common data elements in institutions and agencies of higher education that will:

- provide improved information to higher education administration at all levels.
- facilitate exchange of comparable data among institutions.
- facilitate reporting of comparable information at the state and national levels.

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HIGHER EDUCATION FACILITIES PLANNING AND MANAGEMENT MANUALS PROJECT

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Office of Education Grant No. OEG-0-9-150167-4534

Western Interstate Commission for Higher Education
University East Campus Boulder, Colorado 80302

November 1969

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PROJECT DESCRIPTION

WICHE Management Information Systems Program

HIGHER EDUCATION FACILITIES PLANNING AND MANAGEMENT MANUALS PROJECT

(SAM -- Space Analysis Manuals Project)

The Western Interstate Commission for Higher Education
in cooperation with
The American Association of Collegiate Registrars and Admissions Officers

Office of Education Grant No. OEG-0-9-150167-4534

November, 1969

A. Basic Objectives

The primary objective of the Space Analysis Manuals project is to write and issue a series of manuals to describe and illustrate methods and procedures for use by college and university personnel in the planning and management of college and university facilities. These manuals will deal specifically with methods for:

1. Measurement of the capacity of existing facilities in relation to the requirements imposed by current programs of the institution;

2. Projection of facilities requirements which result from the expected development of institutional programs;

3. Management of building space resources to obtain effective use through assignment, allocation, and scheduling processes.

A secondary objective of the SAM project is to issue these manuals in a form consistent with the other products of the WICHE Management Information Systems Program. The descriptions and illustrations incorporated in the SAM Manuals will be cast in terms of the Data Element Dictionaries and the Program Classification Structure being developed in the WICHE Management Information Systems Program.

B. Assumptions

The general approach to the material in the manuals will reflect the following assumptions:

1. The primary audience will be composed of registrars, deans, business officers, faculty members, and other college or university personnel who are not specialists in facilities planning and management.

2. The primary audience will be found in new and/or smaller institutions, both public and private.

3. The primary need of the typical users is to develop a capability for institutional self-analysis. A secondary need arises from the requirement to furnish data to state and federal agencies in a format which allows inter-institutional comparisons.

4. While most of the smaller institutions are by no means static, they are not generally confronted with situations involving dramatic changes in size and mix of student body, programs, or institutional techniques.

5. The potential for dramatic program or curriculum change must be allowed for in the methodologies described in the manuals.

6. Problems associated with reassignment, reallocation, and replacement of facilities are likely to be at least as significant as those associated with construction of additional facilities.

7. Computer capability cannot be assumed.

8. Availability of required data cannot be assumed.

These assumptions place several constraints on the approaches which can be used to present the material in the manuals. The assumptions lead to the conclusion that the program analysis portion should not be presented in abstract or overly generalized terms; the process must be placed in a familiar institutional context.

If the assumptions are correct, the context most familiar to the reader will be that of a small institution. Therefore, the manuals will use a description of a real liberal arts college as a prototype for presenting the material in concrete terms.

In order to insure that a consistent set of illustrative data are available for reference when needed in later chapters, the first section of the manuals will be devoted to a detailed description of the prototype college. This description will have two distinct aspects. First, a narrative sector will include a general description of the size and type of the institution; an indication of the institution's philosophy, goals and objectives; and, an indication of its administrative structure and other information necessary to complete the sketch of the institution.

The second sector of the description will focus on the quantitative elements of the prototype college, including the following:

1. The student population categorized by the numbers of students by level, by sex, by major program, and similar attributes significant to the institution.

2. Number of faculty and staff by level and department.

3. Numbers of rooms of various types (i.e., a facilities inventory).

4. Course offering data including such quantitative elements as credit and contact hours assigned as well as course attributes such as the methods by which each of the courses is conducted (e.g., lecture, recitation/discussion, and laboratory).

5. Quantities of library holdings by Library of Congress or Dewey-Decimal categories.

C. General Orientation

The manuals will be oriented to the evaluation and management of existing facilities within the framework of present and future program requirements of the institution. This orientation reflects certain characteristics of physical facilities resources:

1. Building facilities require long periods of time to develop. With proper maintenance, they have very long lives relative to most other types of institutional resources. Facilities resources are consumed only in the sense of occupancy or use.

2. The addition of a single new building to a campus involves a large incremental step which can greatly alter an institution's current occupancy/capacity measures. Facilities cannot be provided in a continuous flow as needed, as operating dollars are. Since a given building usually has been planned with long-range capacity for certain disciplines in mind, measurement and analysis of usage early in its life are misleading unless usage is evaluated within the context of expected future program developments.

3. Building facilities are not portable resources. The operations of a college or university often require that organizational units with related activities be located physically within an efficient proximity. Therefore, it is necessary to assess future requirements of related units rather than present needs of unrelated units to establish effective use of facilities over time.

4. Building facilities are not readily flexible resources. They can be converted to meet changing program requirements only with the expenditure of time and money for renovation. Good utilization, in the short-run, may require high expenditure with short-term benefit. Such an expenditure could be avoided by planning for good utilization at a specified point in the future (two to five years). Interim uses of space that may yield poor utilization in the short run may be justified on the basis of longer-range economies, the efficiencies of proximity, or the necessities imposed by other institutional values.

The primary commitment to this general orientation enhances the importance of program planning and analysis. A major portion of the manuals will be devoted to facilities planning and management built on the foundation of program planning and analysis.

D. Sequence of Development

The material covered in the manuals will be developed in the following sequence:

1. Measures of Present Capacity

Two factors determine the selection of methods for measuring current capacity as the starting point for the manuals. First, knowledge of the present situation is fundamental to the planning and management of space resources. Second, it is anticipated that state and federal requirements will make determination of current capacity a topic of widespread concern.

Methods for measuring and evaluating the capacity of all types of facilities will be included. These methods will be designed specifically for use at the institutional level and will be illustrated with examples drawn from the prototype college. The techniques for aggregating the data reported to government agencies will be included in the illustrations.

2. Program Planning and Analysis

While the current capacity of physical facilities can be measured in terms of existing conditions, steps taken to change these conditions on the basis of such measurements should be taken in the light of the future program requirements of the institution. This implies that effective facilities management is heavily dependent on the ability to project the institution's program requirements. Therefore, two levels of program analysis will be included:

a. Detailed Program Analysis and Planning

Detailed program analysis requires the specification and integration of a large number of institutional program characteristics and policy decisions or assumptions. It is a complex undertaking for any institution and will be carried out from beginning to end at three to five year cycles at any one college or university. It is an exercise which is fundamental to understanding not only the relationships which are at work within an institution but also the implications of changes in the institutional structure, scope, or activities.

Program analysis techniques will be explained through the mechanism of changing certain conditions at the prototype college and investigating the results. The various sets of conditions selected for illustrative purposes will be chosen so that, taken together, they thoroughly cover the field of program planning and analysis.

The following situations illustrate some of the changed conditions employed:

i. A situation in which the proportion of majors in various programs changes illustrates the effects on class size distributions and faculty loads in different organizational units. A situation in which teaching methods are changed significantly could also illustrate some of these relationships.

ii. The initiation of a graduate program at a prototype college illustrates the effects on research and library resource requirements.

iii. A situation of growth illustrates changes in requirements for administrative and student services, recreational facilities, and housing and dining accommodations.

b. Generalized Long-Range Planning Techniques

Since detailed program planning is a complex process, a simplified and more generalized set of long range planning techniques is required. In essence, an institution requires techniques for developing rules of thumb which are applicable to its unique situation.

It will be the purpose of this section to explain how generalized program load indicators can be derived from the detailed program characteristics and decision elements described.

c. Matching Facilities and Program Requirements

The facilities required for the successful operation of an institution's programs can be made available either through a reallocation of existing facilities or through construction of new facilities. Common to both processes are methods for translating program load indicators into facilities requirements of various types. As a result, the heart of this section lies in detailed explanations and illustrations of those methodologies for determining how much of each type of space is required to satisfy the load imposed by the various programs (see Appendix C). A major chapter on scheduling

will be included as an integral part of the process for converting instructional program loads into the requirements for classroom and class laboratory facilities.

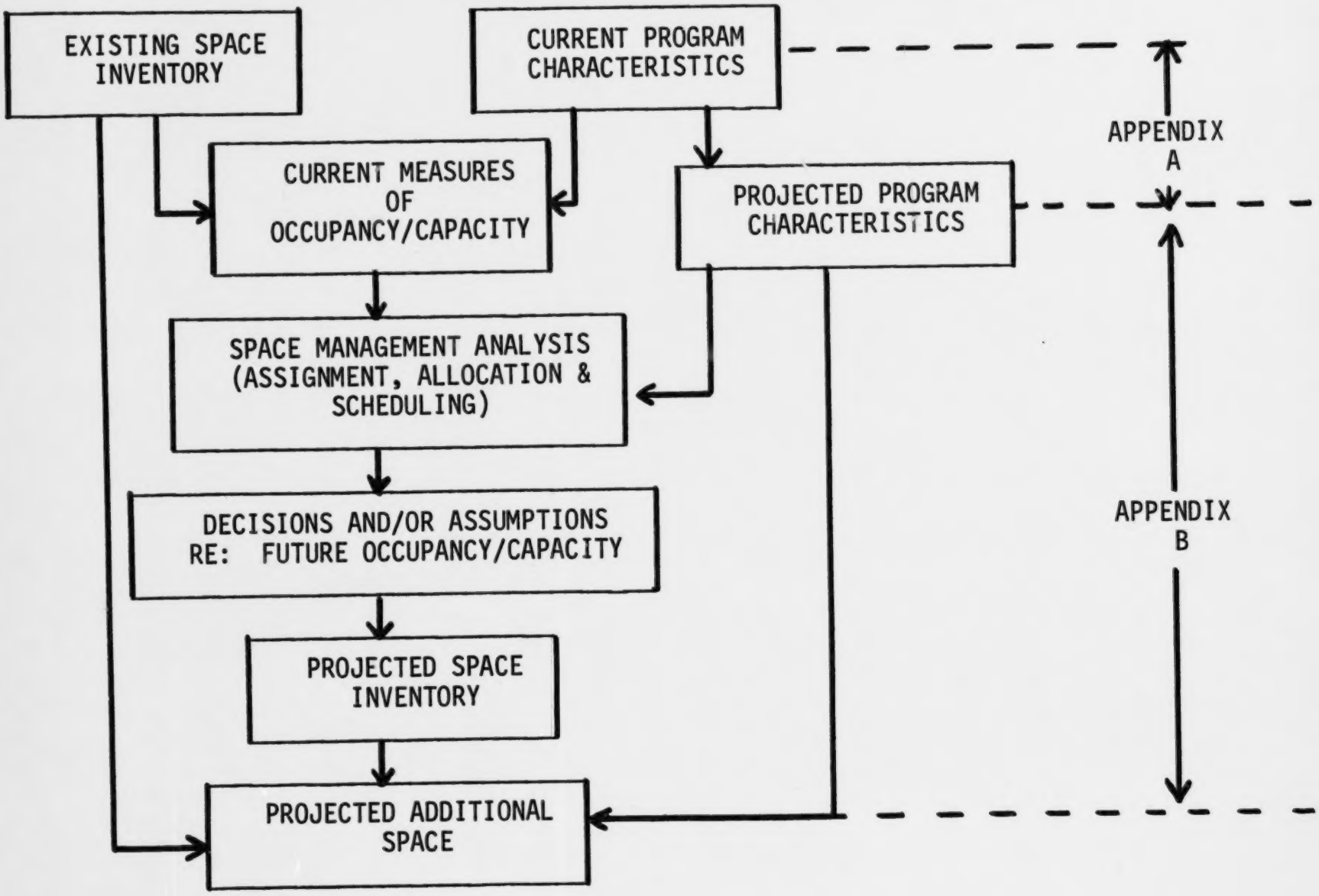
Once the program load projections have been converted to facilities requirements, present availability is compared with future need and the imbalances may be adjusted. One set of methodologies approaches this problem through reassignment of present facilities. A second set illustrates the process of building programming.

The plan is to present in appendices a listing of utilization and unit floor area criteria employed by a variety of different institutions and governmental agencies.

The current phase of the SAM project does not anticipate dealing with the dollar cost of facilities requirements or methods of allocating capital investment to current operating costs. It also should be emphasized that the manuals, at the initial stage, will not deal with the management aspects generally known as physical plant maintenance and operation.

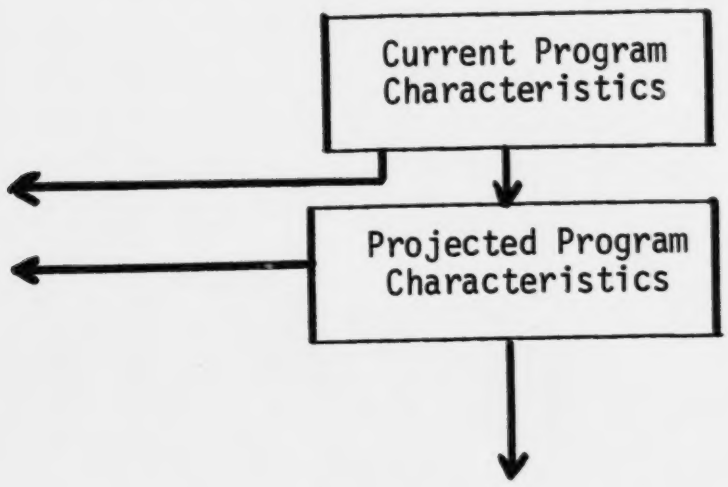
It is anticipated that a future addition to the WICHE-MIS Program following the SAM project will take up the difficult and complex, but very important, areas of long-range capital financing, building cost evaluation and estimating, and the association of capital costs with program costs.

STRUCTURAL DIAGRAM: SPACE ANALYSIS MANUALS PROJECT

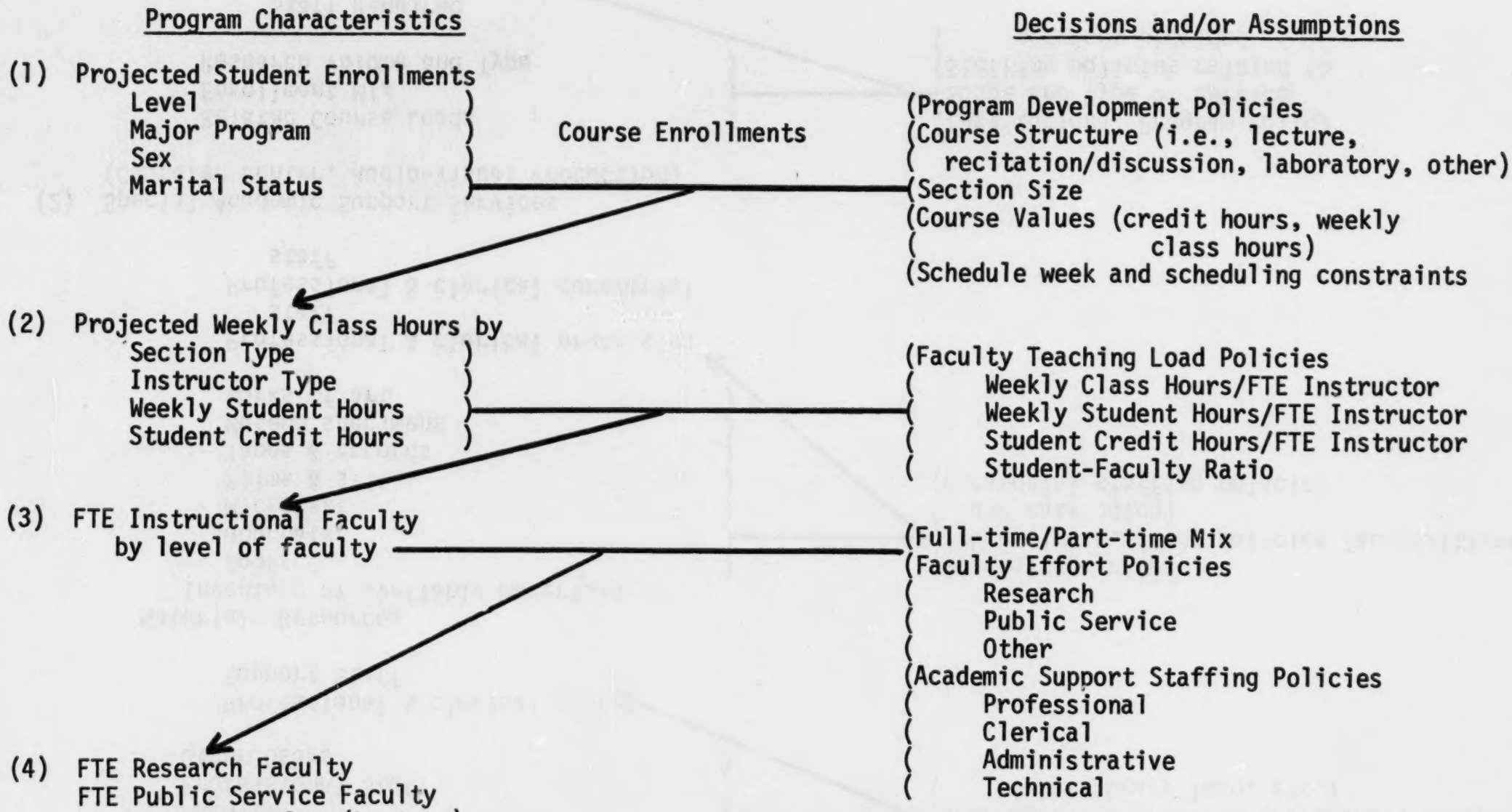


APPENDIX A

Projection of Program Characteristics



1. Academic Programs



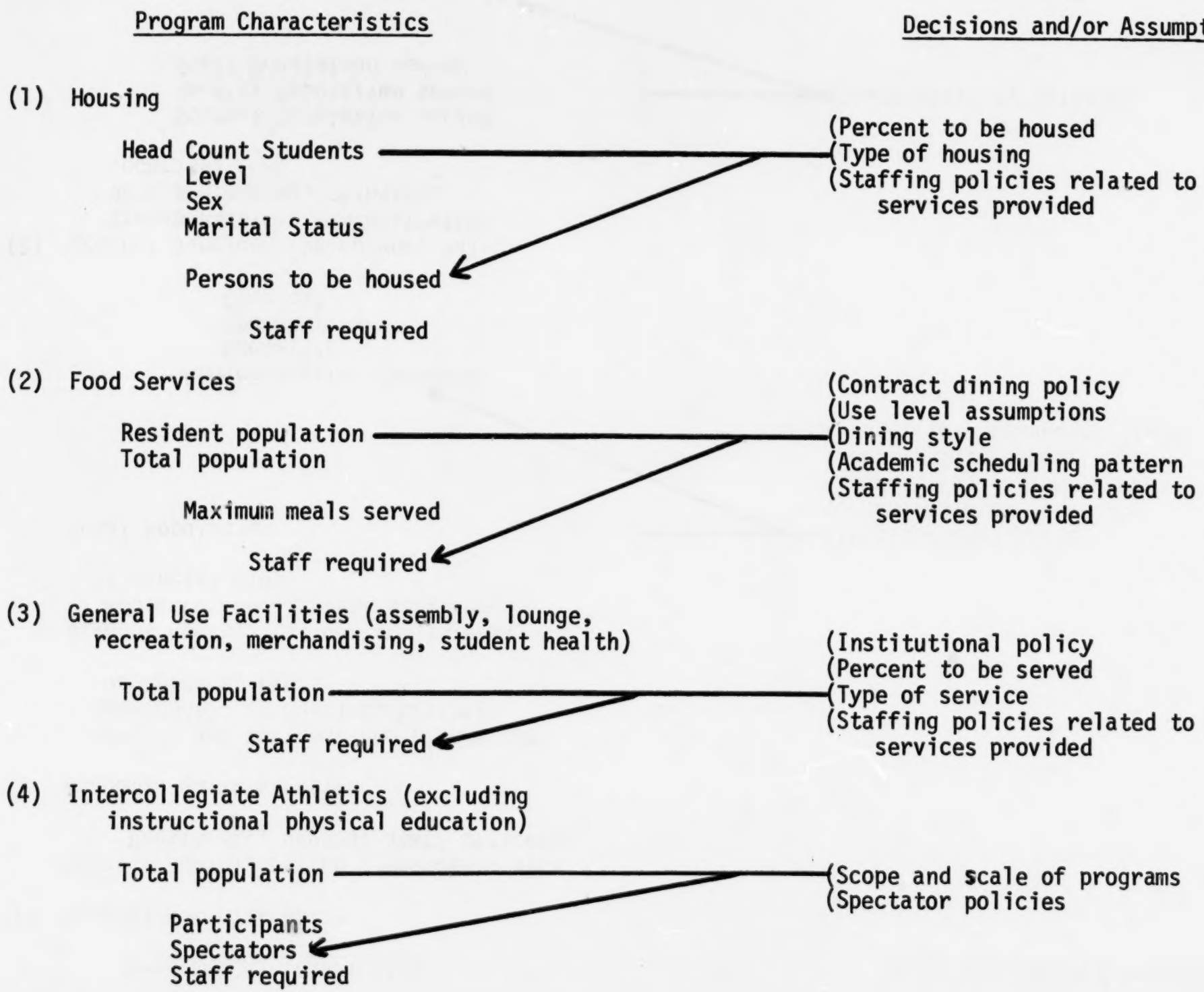
2. Academic Support Programs

Program Characteristics	Decisions and/or Assumptions
(1) Study Facilities (Library, Gallery, Museum, Other)	
Users	
Students by level & program Faculty Professional Staff Other Users	(Percent of user group seated simultaneously (Type of Seating (User services provided (reference, circulation, interlibrary loan, etc.)
Professional & clerical user Support Staff	
Materials Resources	
Inventory of available materials	
Books Journals Microtext Films & slides Tapes & records Museum specimens Works of art	(Acquisition rates (Processing staffing policies (acquisitions and cataloging) (Curatorial staffing policies
Professional & clerical processing staff Professional & clerical curatorial staff	
(2) Special Academic Support Services (Computer Center, Audio-Visual Production)	
Related Course Loads Enrollment Mix Research Volume and Type	(Institutional Program Policy (Scope and Type of Service (Staffing policies related to services provided
Staff Required Equipment Required	

3. Administration

Program Characteristics	Decisions and/or Assumptions
(1) General Administration	
Central Administration (President, Vice Presidents, Central Staff Officers)	
Academic Administration	
Financial and Business Administration (personnel, accounting, business management, etc.)	
Student Administration (Admissions, Registration, Student Services, Financial Aid)	
Total Population	(Institutional Scale (Organizational Structure (Student Population/support staff (Faculty Size/support staff (Budget Volume/support staff
Administrative Personnel Executive Professional Clerical	
(2) Central Services (telephone, mail, transportation, administrative data processing, printing, security)	
Student Population served Faculty Population served Staff Population served	(Staff/Staff by category
Central Services Staff	

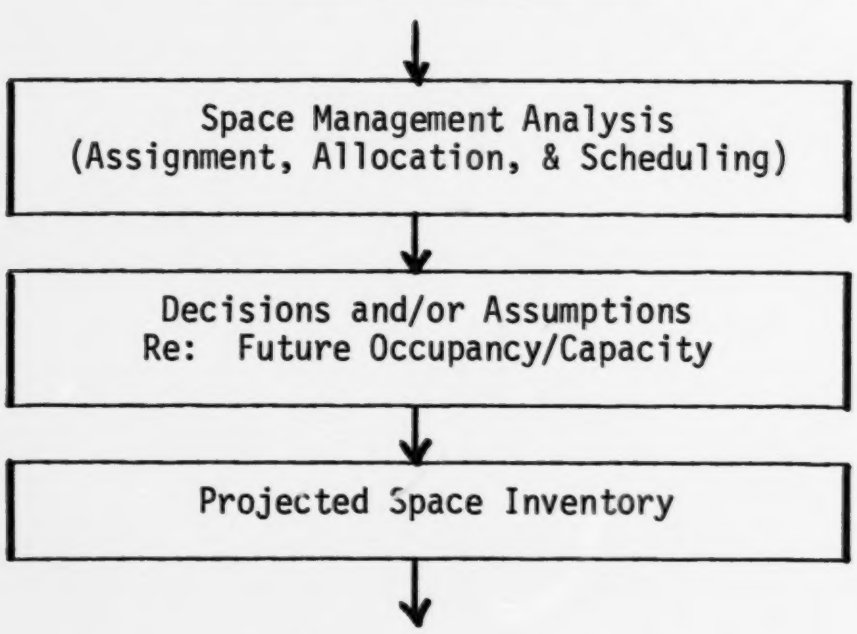
4. Student Services



5. Physical Plant

Program Characteristics	Decisions and/or Assumptions
(1) Physical Plant	
Size of Plant Land Area Maintained Rate of Capital Expenditures Age and Condition of Plant	(Level of Maintenance Expected (Institutional Expansion Policy (Contract Services (Staffing policies related to services provided and work performance
Staff Required Equipment Required	

APPENDIX B


Space Management Analysis and the Projection of Facilities Requirements
Space Management Analysis (Assignment, Allocation, & Scheduling)
Decisions and/or Assumptions Re: Future Occupancy/Capacity
Projected Space Inventory

1. Instructional Facilities

A. To include the following types of space:
Classrooms
Class Labs
Special Class Labs
Individual Study Lab
Armory Facilities
Clinic Facilities
Demonstration Facilities

B. Rationale for the grouping:
a) Similar program activity load units and policy factors; therefore, requirement projection techniques are comparable.
b) Armory, instructional PE facilities, clinic facilities, and demonstration facilities are recognized as unique categories of space, but projections can be made on same program load base as projections for class labs.
c) Capacity/occupancy criteria are generally comparable.

C. Description of pertinent capacity/occupancy criteria (e.g., WSH/station, Weekly Room Hours/Room) and explanation of how these criteria are derived from the policy factors. (An appendix will indicate criteria used by a variety of institutions and state agencies.)

D. Description of the methodology for converting projected activity loads into Space Unit Requirements.

E. Analysis of projected space unit requirements vis-a-vis existing space units (comparison of projected needs in time period 0 vs. current availability as a measure of utilization).

F. Description of Pertinent Management Techniques. This will be a major section primarily devoted to an explanation of scheduling methodologies and the effect of changing policy factors on facilities requirements.

G. Analysis of effects of curriculum innovation on instructional facilities.

2. Non-Class (Research) Laboratories

A. Methodologies apply to:
Non-Class Laboratories
Special Research Installations
Research Service Areas

B. Basic Characteristics: This type of space is very tenuously tied to the measurable program activity load indicators. Many unpredictable factors enter into finally determining needs for non-class lab space.

C. Description of the methodology for converting projected activity loads into space unit requirements.

D. Analysis of future need versus current availability (geared to new programs).

E. Management techniques - Tabbing research space for re-assignment after completion of project.

F. Appendix: Unit Floor Area Criteria

3. Office Facilities

A. To include all office facilities regardless of organizational unit or program to which they are assigned.

B. Rationale: Requirements for office space are generated by people performing a wide variety of functions. The program activity load indicators are extremely numerous because they relate to this wide variety of functions.

Policy factors and analysis and management techniques, however, are similar. As a result, it has been decided to treat office facilities as a group, rather than to treat them in a number of chapters as determined by the relevant program activity load indicators.

C. Capacity/Occupancy Criteria
   a) Fuller Committee and Illinois suggest NASF per FTE staff member requiring office space.
   b) Percent station assignment by office "category" (presupposes different types of offices).

D. Description of the methodology for converting projected activity loads into Space Unit Requirements.

E. Analysis of Projected Space Unit Requirements vs. Existing Space Units.

F. Management Techniques - Alternate assignment possibilities.

4. Study Facilities

A. To include the following types of space:
Study Rooms
Stack Space
Open-stack Reading Room
Exhibition Facilities

B. Rationale: With the exception of offices, this group includes those types of space commonly included in libraries, museums, and galleries. Activity load indicators and policy factors are generally similar.

C. Description of the methodology for converting projected activity load units into space units (which convert directly to floor areas in this particular case).

D. Analysis of projected space unit (floor area) requirements as compared to existing conditions.

E. Description of pertinent management techniques. In this chapter, this section will be confined to illustrating how any mismatches discovered in the analysis can be affected by changes in policy factors.

F. Appendices
a) Unit floor area criteria
b) Illinois-stype equivalent volume and Study demand unit calculations.

5. Housing and Dining Facilities

A. To include:
Residence for Single Persons
One Family Dwellings
Multiple-Family Dwellings
Food Service

B. Rationale: Similar Activity Load Indicators and Policy Factors. Food facilities (code 630) open to the student body or public at-large are included with residences because of similar load indicators, policy factors and capacity/occupancy criteria.

C. Description of the methodology for converting activity loads into building space units and floor area requirements.

D. Analysis of projected requirements as compared to existing conditions.

E. Management techniques.
a) Building flexible housing to avoid imbalance of need vs. availability in housing for single male or single female students.
b) The effect of the class schedule on dining hall operations.

F. Appendix - Unit Floor Area Criteria

6. General Use Facilities

A. Includes:
Assembly
Food
Lounge
Merchandising
Recreation
Student Health

B. Rationale: Need for these types of space is almost exclusively a function of policy factors. As a result the treatment in the manuals will, of necessity, be quite different.

C. Capacity/Occupancy Measures
a) Per cent infirmary beds occupied during period of peak use.
b) Per cent food facility seats occupied during period of peak use and turnover rates.
c) Per cent assembly hall seats occupied during period of peak use.

D. Description of the methodology for converting activity loads into building space units and floor area requirements.

E. Analysis is confined to a comparison of what is available vs. what is desirable.

F. Space Management techniques are less significant for these types of space than the specialized aspects of food service management, merchandising management, etc., and will be mentioned only briefly.

7. Physical Education and Athletic Facilities

A. Includes:
Gymnasiums
Field Houses
Stadiums
Play Fields
(Does not include classroom facilities for Physical Education Programs).

B. Rationale: Frequent interchangeable use and similar capacity/occupancy criteria.

C. Description of methodology for converting projected activity loads into space unit requirements.

D. Analysis generally related to size and number of organized activities and spectator requirements.

E. Description of Management Technique. Largely a scheduling problem (see 1F).

8. General Support Facilities

A. Includes:
Data Processing - Computer Facilities
Shop Facilities
Storage Facilities
Vehicle Storage
Audio-Visual Radio and TV
Utility Services

B. Rationale: Similarity of policy factors. Programming dependent on the institution's perception of its need.

C. Association of Unit Area Criteria with Scope of Requirements.

APPENDIX C

Factor Relationships in Building Space Programming

Program Analysis Sequence

The general process for determining the requirements for different types of facilities is indicated on page C-4. This general process is fundamentally as follows:

1. Identify the programs which affect the requirements for each type of facility. It is the intent to use the WICHE MIS Program Classification Structure as the basis for categorizing these programs.

2. Measure the activity loads for each program (i.e., state this effect in quantitative terms). The following are examples of program activity load indicators:
   a) Numbers and types of persons requiring accommodations within the facilities.
   b) Number of units of space consumers (e.g., books, cans, special research equipment units).
   c) Amount of time expended in an activity which requires use of a particular type of facility.

3. Specify those policy assumptions which, in essence, define the institutionally-placed constraints on resource availability. Examples are:
   a) Definition of the schedule week (i.e., constraining time availability).
   b) Definition of faculty loads.
   c) Specification of acquisition rate of library resources.

4. Specify the occupancy rates considered desirable in light of some of the constraints - capacities - previously established (i.e., designate utilization or occupancy/capacity criteria). Such criteria may be expressed as factors of:

a) Time (i.e., number of hours a given facility is expected to be used relative to the maximum number of hours it is available).
b) Number of users (i.e., one senior faculty member per office).
c) A combination of elements such as number of users per unit of time (e.g., the turnover rates applied to users of such facilities as libraries and dining halls).

5. Determine the number of space units required by dividing units of program activity load by the specified occupancy-capacity criteria.

6. Apply unit floor area criteria to the resulting number of required space units to determine the calculated need of net assignable square feet of each type of facility.

7. Apply conversion factors to the calculated net assignable square feet requirements to determine gross building area requirements.

It should be noted that, at present, the technical ability to apply this generalized process of analysis and projection varies widely among the different types of facilities.

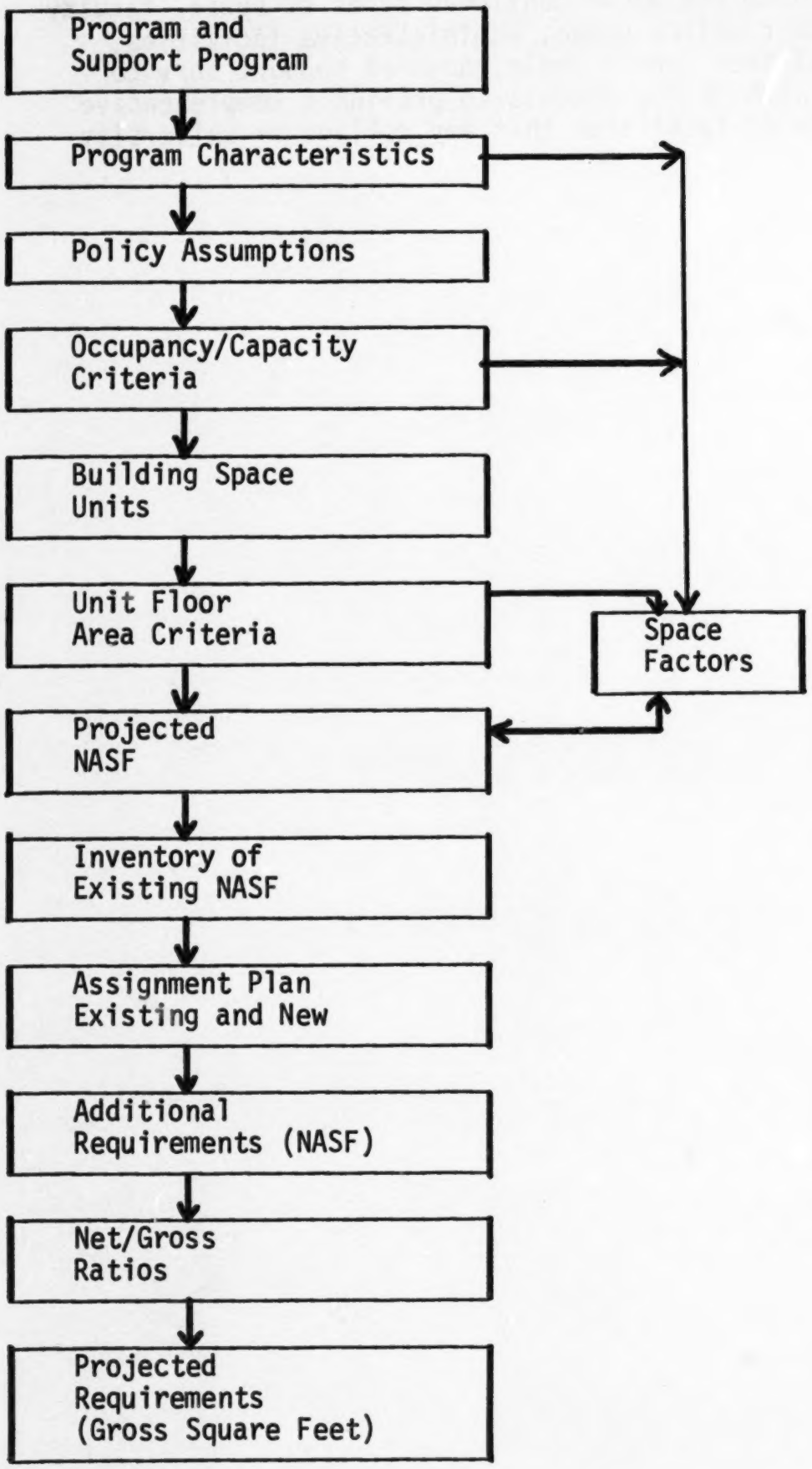
The techniques associated with analyzing and projecting requirements for classrooms and class labs are relatively sophisticated.

The methods for analyzing library, museum, and other student study facilities are less formalized and more dependent on assumptions or policy decisions about how such facilities are to be utilized in relation to institutional programs.

Techniques for dealing systematically with requirements for research space are practically nonexistent. Research facilities requirements vary widely with the needs of individual scholars and projects. They are by far the most difficult types of facilities with which the manuals must deal. Nevertheless, the need to do long-range planning for research facilities is not to be escaped by virtue of its difficulty. Although research facilities do not lend themselves to analysis and projection through strict adherence to simple formulae, more rational methods of assessing and estimating research facilities needs must be developed, illustrated, and carefully interpreted in the manuals for use by those inexperienced in this area.

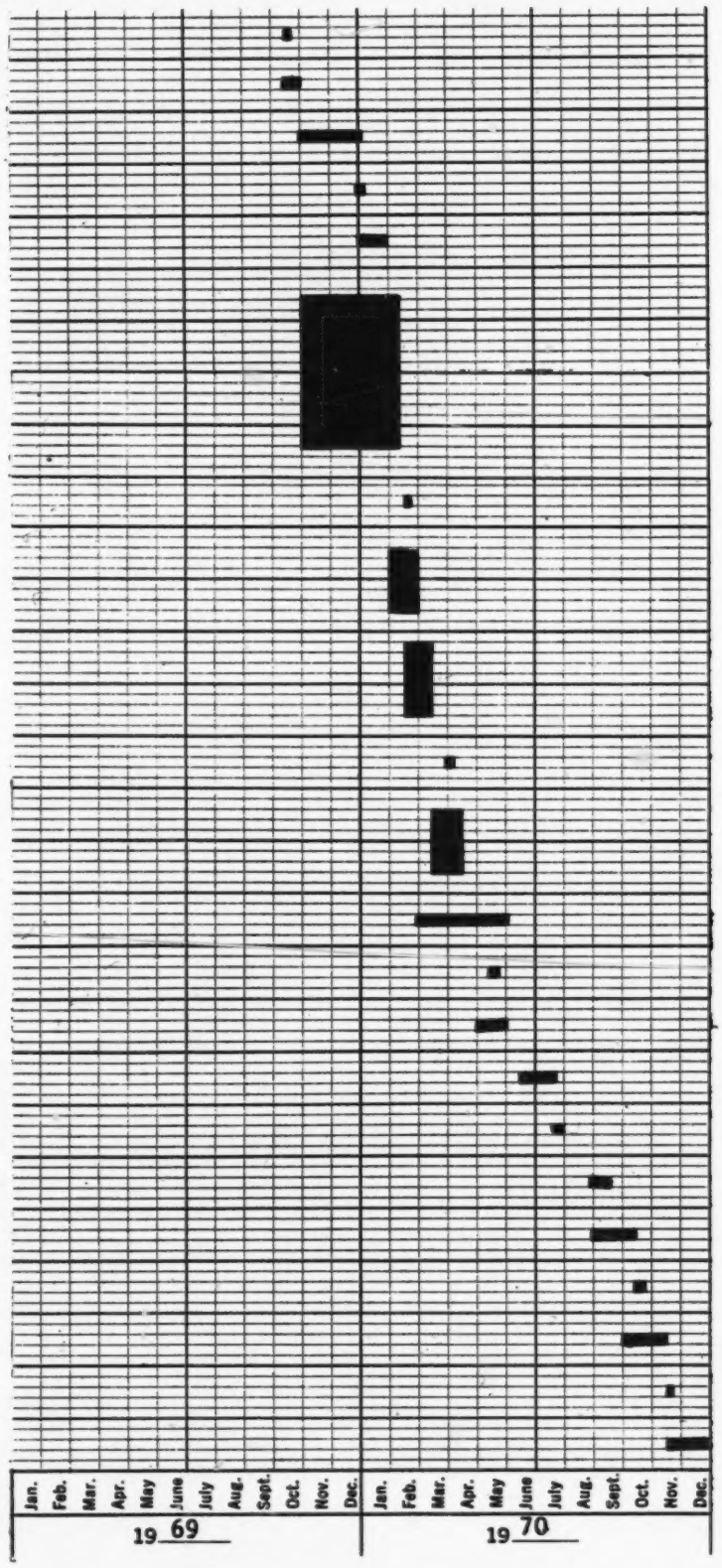
In addition to the above-mentioned types of space, faculty and academic department office space, administrative facilities, student service facilities, and a whole range of support service space will be dealt with in the manuals to provide a comprehensive coverage of the types of facilities that any college or university may require.

FACTOR RELATIONSHIPS IN BUILDING SPACE PROGRAMMING



WICHE-AACRAO SPACE ANALYSIS MANUALS PROJECT

PROJECT SCHEDULE



1.	Advisory Review Panel & Task Force	October 22-23
2.	Revise Project Description	October 24-31
3.	Draft Academic Program Analysis Sect.	November 1-December 31
4.	Task Force Review Meeting	January 7 - 8
5.	Draft Acad. Support Analysis Sect.	January 1-31
6.	Draft Instructional Facilities Sect.	November 1 -
7.	Draft Scheduling Sect.	February 15
8.	Draft Study Facilities Sect.	
9.	Draft P.E. & Athletic Facilities Sect.	
10.	ARP & TF Review Meeting	February 25-26
11.	Draft Admin., Student Services Sect.	February 1-28
12.	Draft Physical Plant Analysis Sect.	
13.	Draft Housing, Dining, Gen. Use Facil.	February 15-
14.	Draft Office Facilities Sect.	March 15
15.	Task Force Review Meeting	April 1 - 2
16.	Draft Research Facilities Sect.	March 15 -
17.	Draft General Support Facilities Sect.	April 15
18.	Draft Bldg. Program & LR Planning Sect.	March 1-May 1
19.	ARP & TF Review Meeting	May 20 - 21
20.	Complete Preliminary Draft	May 1-30
21.	Circulation of Preliminary Draft	June 15-July 15
22.	ARP & TF Review of Responses	July 22 - 23
23.	General Circulation Draft	September 1
24.	General Field Review	September 1-October 15
25.	Task Force Review Meeting	October 14 - 15
26.	Write Final Draft	October 1-November 15
27.	ARP & TF Final Review	November 18 - 19
28.	Final Preparation/Publication	November 21-December 31

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